

# 15 Environmental attitudes, management and performance

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## Introduction

Over the past two decades the Swedish construction industry has made a lot of effort to develop green building practices. Researchers within the field have provided a theoretical understanding of how to design green buildings and analytical environmental management tools have been developed to guide practitioners. Furthermore, information campaigns have raised general environmental awareness amongst practitioners. In spite of these efforts, mainstream building practices do not seem to have undergone any marked changes (Gluch, 2005; Femenias, 2004). Progress toward a viable and sustainable construction industry relies on its ability to foster and transfer innovative products, services and practices (Keast and Hampson, 2007). However, the absence of the large-scale innovation necessary to drive this development forward is evidence of an imperfect process. This raises a number of questions: why is it so difficult to incorporate environmental issues into mainstream business? How are environmental issues actually dealt with in the construction industry? Has development stagnated? What is causing green innovation inertia in the industry? Fundamentally, *what makes it slow?*

This chapter aims to provide some answers to these questions by empirically examining environmental attitudes, management and performance in the Swedish construction industry. The chapter is based on a questionnaire survey carried out in the autumn of 2006 which is almost identical to one carried out in 2002 (Baumann *et al.*, 2003). The questionnaires were sent to environmental managers or their equivalent in firms having at least 50 employees in real estate, engineering and construction, and architectural firms with at least 20 employees. This covered 542 firms and resulted in a response rate of 45.4 percent. The structure of the survey included the industry's definition of environmental challenge, attitudes toward the challenge and the performance of, and response to, environmental measures taken by the firms.

Results from the 2002 study showed that many firms at the time were working with environmental issues. However, the study showed that their

work focused mainly on a few targeted areas, e.g. toxic substances and waste management, which departed from what they perceived as the industry's main challenge – energy savings. Firms placed much emphasis on high-level environmental management activities, e.g. environmental management systems (EMS), while the implementation of technical environmental measures met with considerable resistance. Of particular note was that significant focus was placed on pre-planning activities while feedback and self-assessment were neglected. This resulted in asymmetric communication within the firm, with the consequence that many environmental managers lacked information about their firms' environmental performance. By repeating the survey, it has been possible to identify trends and institutionalizing processes that contribute to, as well as hinder, sustainable development and green innovation within the construction industry. This chapter points toward some possible explanations as to why the development of environmental measures sometimes does not go in the direction intended by senior managers despite receiving attention and effort.

### Research method

The 'Environmental Barometer for the Construction Sector' is a questionnaire-based study with the objective of surveying environmental attitudes, management and performance within the Swedish real estate and construction industry. The structure, as schematically illustrated in Figure 15.1, has been developed from the questionnaire used by the 'International Business Environmental Barometer' (IBEB), which has measured the state of environmental management in the industry since 1993. The terminology and wording in IBEB's standardized questionnaire has been adjusted to take account of terms and words better suited to construction. The structure of the survey covers the industry's definition of its environmental challenge, attitudes toward this challenge and the performance of, and response to, environmental measures.

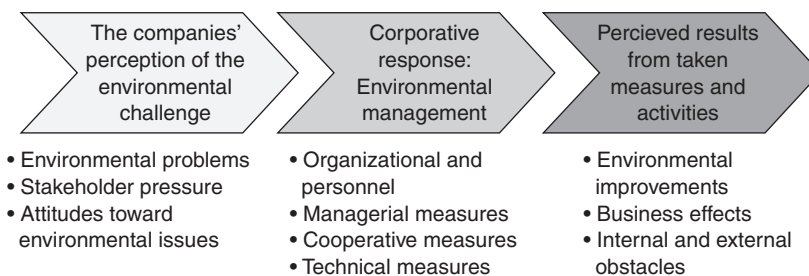


Figure 15.1 General structure of the survey.

### *Preparation of the questionnaire*

The questionnaire used in the 2006 study has changed just slightly from that used in the 2002 study. A deliberate intention was to keep the questionnaire as intact as possible in order to be able to make comparisons over time. The 14-page questionnaire contains five main sections: business characteristics, environmental management, environmental impact, environmental measures and reflections on the effects of measures taken. A section directed solely at real estate firms concerning energy declarations was also added, but is not presented in this chapter. The questionnaire contains a total of 39 main questions, most of which have alternative sub-questions.

### *Statistical population*

The survey covers all companies in Sweden with at least 50 employees within construction (NACE group code 45, executing construction companies), development (NACE group code 70, property owners and managers), consulting engineering (NACE group code 74202) and companies with at least 20 employees within architecture (NACE group code 74201). At the time of the survey, 620 companies had a core business that fell into one of these categories. Several of the companies, especially consulting engineers, do not, however, belong to the construction industry, for example ICT and energy consultants. After correction, the final population to which the questionnaire was sent consisted of 542 companies and/or other organizations. The questionnaires were directed at environmental managers or their equivalent.

### *Organization of survey*

The questionnaire, under cover of an introductory letter, was sent to each company: their addresses were obtained from the companies' register at Statistics Sweden. Three reminders were sent out, the last of which contained a copy of the questionnaire. In addition, and for the purpose of investigating reasons for non-response, an email was sent to companies that had not returned their completed questionnaire after the second reminder. Data were abstracted from the questionnaires and analyzed using the statistical program, SPSS. In order to secure reliability and validity of the survey, a statistician was consulted before data collection and after the analysis had been performed.

### *Validity and reliability of the study*

There is always a risk in surveys intended to measure peoples' attitudes and values that respondents will answer as they believe they should answer and/or attempt to place themselves and their companies in a (more) favorable light. It is, therefore, important to acknowledge that the survey

does not present an objective truth about the companies' environmental work, but rather it measures what respondents perceive as their environmental challenge, problems and so forth. There is also a further risk, since the survey is directed to environmental managers; they generally have a larger interest in environmental issues and, therefore, may not be representative of the overall values prevailing within the companies.

Moreover, it may be the case that companies paying more attention to environmental management will be more benign when answering, which might lead to results that are unrepresentative of the construction industry as a whole. However, pre-testing the questionnaire on practitioners, having an informative covering letter with detailed contact information in case of queries, sending multiple reminders and investigating the reasons why some respondents failed to respond helped to reduce bias in the result caused by problems of interpretation and non-response and is in line with recommended research practice (Bryman, 2008).

The significance of this discussion is that the reader can recognize the potential for bias in the interpretation of results. This chapter presents basic frequency analysis only, whereas the database permits more advanced and detailed analyses which would strengthen the study's validity. A more detailed description of the methodological approach can be found in Gluch *et al.* (2006).

## Results of the survey

246 environmental managers out of a possible total of 542 completed the questionnaire, corresponding to a response rate of 45.4 percent. The distribution of the four groups is presented in Table 15.1.

### *Environmental challenge as perceived by the companies*

The environmental challenge is defined by how the companies see themselves contributing to environmental problems and how they experience environmental pressure from stakeholders. The following sections discuss these findings.

Table 15.1 Total number of companies, response frequencies and rates

	Sample size	Rate(%)	Responses	% Rate	Answers (%)
Construction companies	300	55.4	123	50.0	41.0
Real estate firms	151	27.8	78	31.7	51.7
Architectural firms	36	6.6	20	8.1	55.6
Consulting engineers	55	10.2	25	10.2	45.5
Totals	542	100	246	100	45.4

*Environmental problems*

Most companies see the use of non-renewable resources, energy and water as their most serious environmental problems. These three areas were also where a majority of the respondents perceived they had lowered their impact. They see their least serious problems in the areas of contaminated soil, risk of environmental accidents, waste management and use of toxic substances (see Figure 15.2). Energy aspects, global climate change and waste were put forward as the construction industry's major challenges now and into the future.

*Stakeholder pressure*

Customers/clients and managers are regarded as the most environmentally influential stakeholders by most companies (see Figure 15.3). The final customer is also considered an important stakeholder along with employees and owners/shareholders of the company. When seen from an environmental research perspective, as well as from one of environmental information, it is noticeable how little influence researchers, environmental organizations, mass media and politicians are assumed to have on the companies' environmental activities. Neither financial interests, such as banks, insurance companies and financial analysts, nor controlling interests such as those of management accountants are perceived as influential on the companies' environmental activities. There are some differences between the groups within the industry, although the client is placed as primary stakeholder by all.

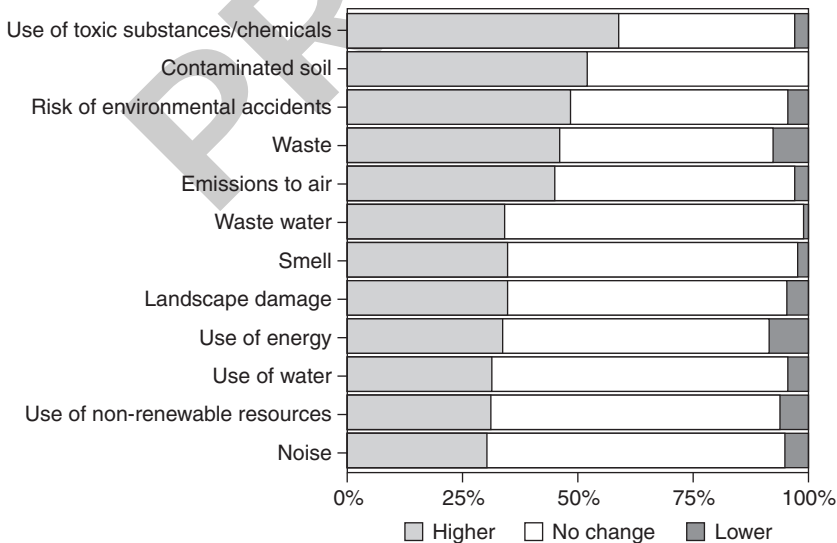


Figure 15.2 Companies' rating of their contribution to various environmental problems relative to the industry average.

Contractors and consulting engineers rank clients higher than developers and architects; developers regard managers and environmental authorities as having a high level of influence.

*Companies' responses to the environmental challenge*

Companies' responses to environmental challenges can take different forms; for instance, employing specialist personnel and creating environmental working groups, cooperation with other stakeholders, technical measures and managerial measures.

*Staffing and environmental personnel*

A majority of the companies have personnel for handling environmental issues within the company (81 percent), although the proportion that does not (19 percent) is, compared to manufacturing industry, relatively high (10 percent in 2001 according to Nilsson and Hellström (2001)). Many of the

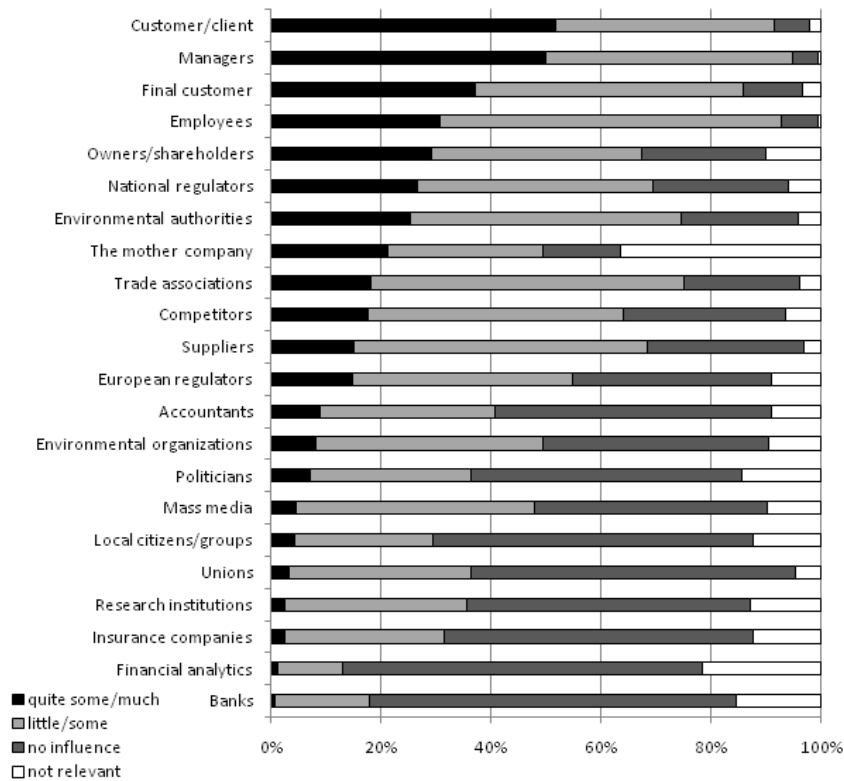


Figure 15.3 Companies' rating of stakeholders' influence on environmental activities in the company.

personnel working on environmental issues do it on a part-time basis, i.e. the person has other tasks besides those of an environmental nature. Most respondents indicated that the number of environmental personnel has remained the same over the past four years (see Figure 15.4). In 2002 (Baumann *et al.*, 2003), the number of environmental personnel was increasing moderately-to-much in the companies, indicating that the number of personnel has stabilized at the level of one person on average per company.

How influential environmental work is in the company is due partly to the official position that the environmental manager occupies in the company. The study shows that a majority of environmental managers (66 percent) are not members of the company board, representing a decrease from the 2002 study when 56 percent were members. There is a difference between the groups such that it is more likely the environmental manager is a member of the board of construction companies (44 percent) than of real estate companies (21 percent).

A majority of the respondents think they have, at least partly, enough knowledge in order to influence practice (85 percent), as well as strategic decisions (85 percent). On the other hand, a relatively significant proportion of the respondents (approximately 25 percent) are not in a position of authority to stop environmentally damaging processes and/or to influence strategic decisions. This reveals a certain discrepancy between ability to influence and authority to do so.

#### *Managerial measures*

The environmental activities of many of the companies are undertaken in accordance with an EMS (73 percent). This is a substantial increase since 2002 when 46 percent had an EMS. When combined with companies that are in an implementation phase or are considering implementation of an EMS, the total is 90 percent, thus mirroring the pervasive force EMS has

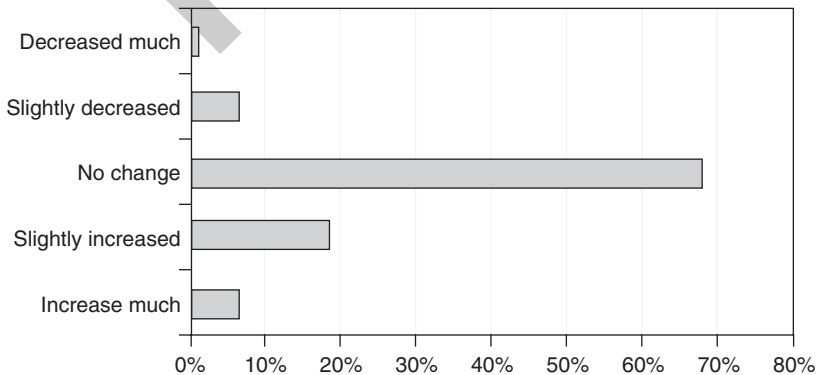


Figure 15.4 Changes in number of environmental personnel during the last four year period.

within the industry. Figure 15.5 shows that managerial activities carried out in the companies are largely related to the EMS; for example, 93 percent of the companies have a written environmental policy, implemented routines to secure the observance of environmental laws (82 percent), established an order of accountability (83 percent) and formulated environmental goals as part of continuous improvement (80 percent) as well as measurable goals (76 percent).

Considering that an overwhelming majority of companies say they set measurable environmental goals, relatively few perform activities that in turn measure environmental performance (see Figure 15.5). Besides activities related to the EMS, the companies foremost carry out activities aimed at transferring environmental information and demands between various actors in the supply chain (see Figure 15.6). Another communicative move is to develop checklists and guidelines. Considering that customers/clients have been put forward as the primary stakeholder, it is surprising that measures such as green marketing and eco-labeling are somewhat rare activities within the companies. In a 'relay' team where many actors are dependent on each other throughout the construction process, from planning to operations, it is surprising that so few are involved in cooperative activities and even more surprising that one-fifth consider it as not relevant.

*Cooperative measures*

Companies' environmental activities are, just as in 2002, not integrated within the company. Figure 15.7 shows that several areas, such as R&D, accounting, marketing and staff policy have no relation to environmental activities undertaken within the company. Environmental activities have

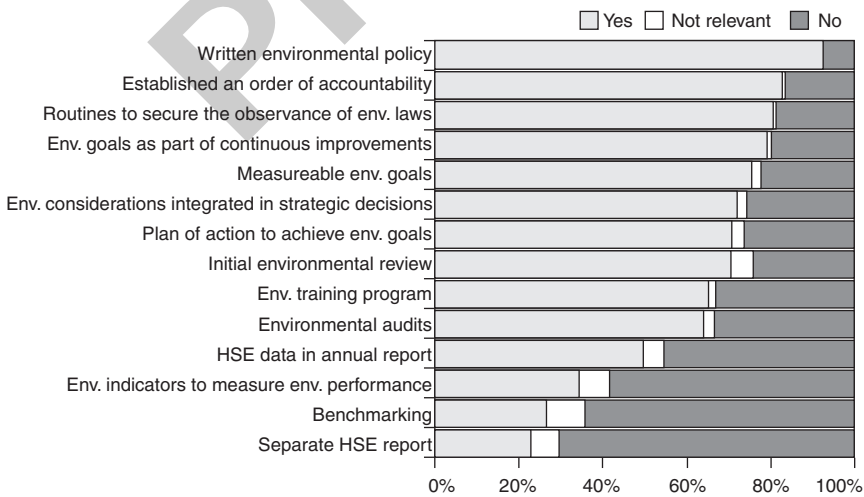


Figure 15.5 Environmental activities related to EMS.



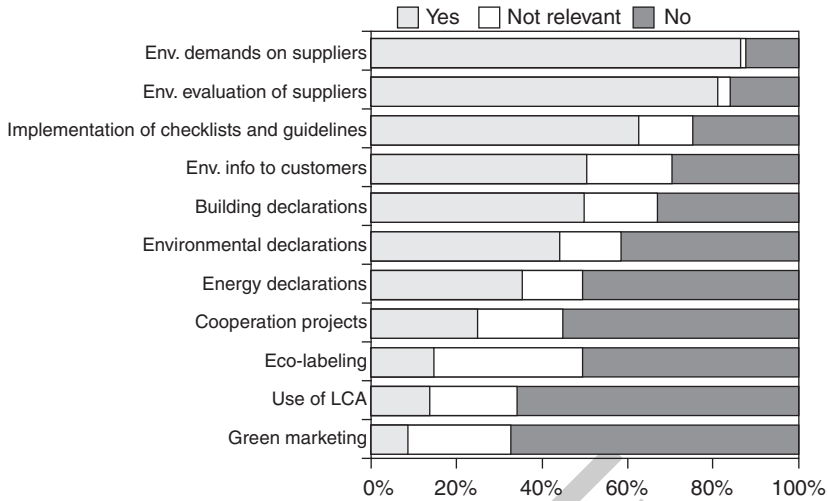


Figure 15.6 Environmental management activities related to purchasing and market.

mostly been integrated with quality, health and safety, which are probably a consequence of companies having organized themselves in this way, with personnel assigned to these multiple tasks.

Most inter-organizational cooperation is carried out with members of the ‘classic’ relay team, i.e. clients, suppliers and customers (Figure 15.8). The parties with which the companies cooperate also agree about those who they perceive as main stakeholders in their environmental activities

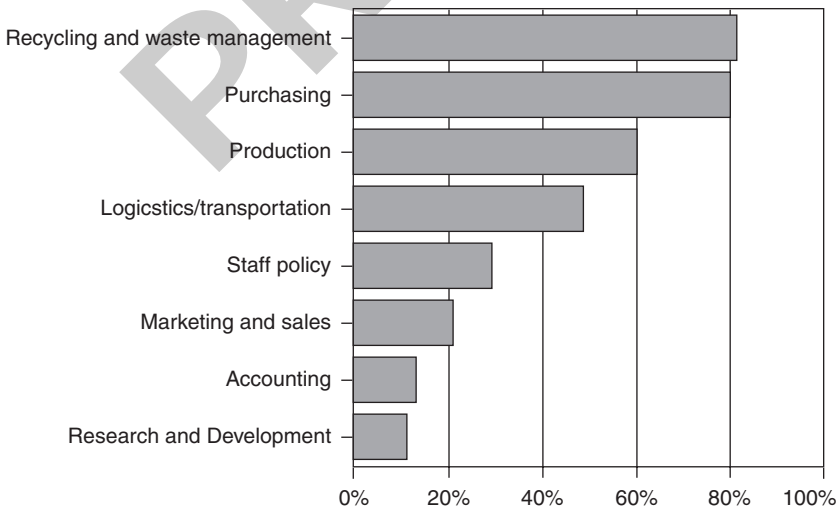


Figure 15.7 Intra-organizational cooperation – business areas where environmental measures occur.

(compare with Figure 15.3). The companies have limited cooperation with R&D units, environmental organizations and departments, accounting or marketing departments (Figures 15.7 and 15.8).

*Technical measures*

Waste separation is by far the most common measure for reducing environmental impact (see Figure 15.9). Other waste management activities and sub-

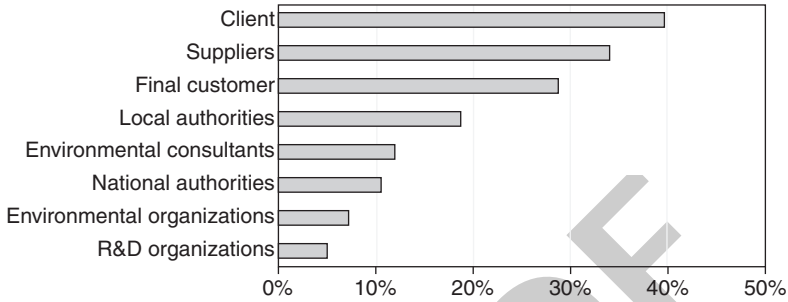


Figure 15.8 Inter-organizational cooperation – stakeholders with whom cooperative environmental measures occur.

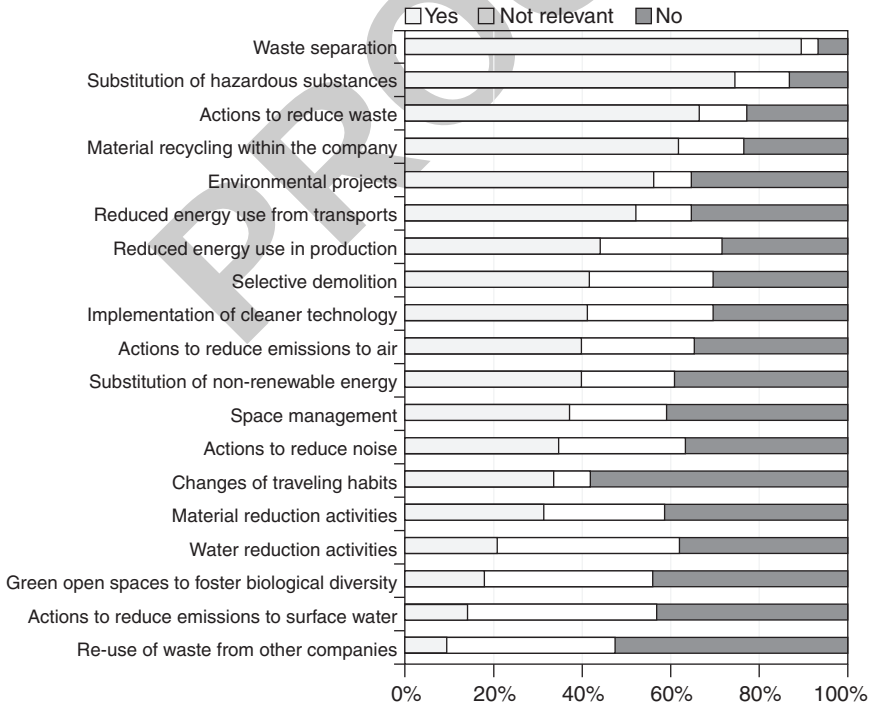


Figure 15.9 Environmental activities of a technical nature in the companies.

stitution of hazardous substances/chemicals are common measures within the industry. Although much effort has been made to reduce waste, several of the respondents regard it as one of the major environmental problems facing the industry. Figure 15.9 also shows that many companies are more devoted to the handling of waste than applying waste minimizing measures. Despite many respondents emphasizing energy as a major problem for the industry, just 39 percent have acted to substitute non-renewable energy sources over the last four years. This is surprising given the importance of energy issues.

### *Results from the companies' environmental activities*

An indication of the success of environmental activities by the companies is found by looking at the impact of those activities on environmental performance and business.

#### *Environmental improvements*

Environmental activities have had most impact on waste and use of hazardous substances, non-renewable materials and energy (see Figure 15.10). Apart from energy use, the results are in line with Figure 15.9 which shows that waste management and substitution of hazardous substances are common activities in the industry. The companies point out that in some problem areas there has been no effect or that they have no information about it.

#### *Business effects*

In line with the results of the 2002 study (Baumann *et al.*, 2003) and other industry sectors (Nilsson and Hellström, 2001), companies in construction

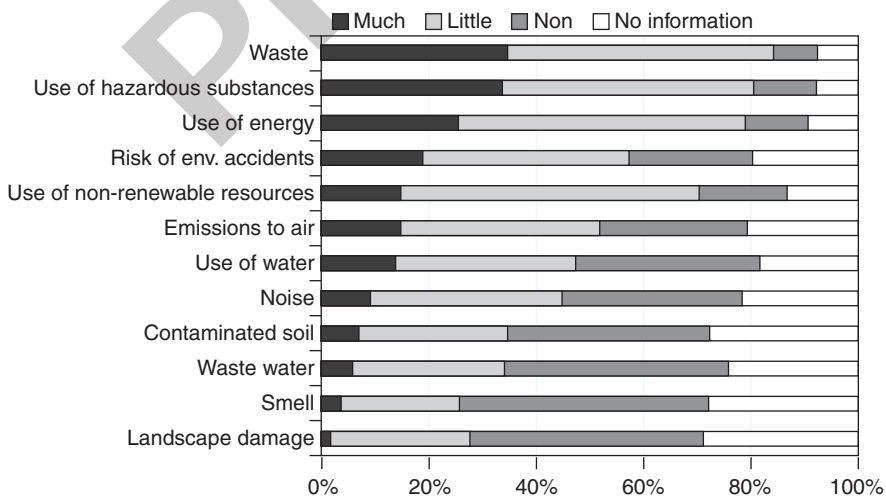


Figure 15.10 Effect of environmental activities on environmental problems.

consider that environmental activities mostly bring long-term benefits to business or benefits for the principal stakeholders, such as staff, management and owners/shareholders. Figure 15.11 shows that a majority of the companies indicated that environmental activities have had a positive impact, especially on company image, whereas they have had a negative impact on profits, cost savings and productivity.

Figure 15.11 also shows that environmental measures taken by most of the companies have had no effect in several business areas. The lack of impact on market factors, such as the creation of new markets and increasing market share, is especially noticeable. This situation can explain the low interest in R&D and innovation, for example clean technology.

### Obstacles to effective environmental activities

Obstacles to carrying out effective environmental activities can be divided into internal (Figure 15.12) and external (Figure 15.13), where the latter are out of the company's immediate control and the former are easier for the company to influence. An internal obstacle which many companies emphasize is that of environmental activities proving too costly; they also cite lack of educated personnel. The foremost external obstacle is that of a lack of market incentives. This perception has risen since 2002 and may be the result of respondents experiencing problems entering the green products and services market.

On an overall level, the experience of companies is that obstacles, aside

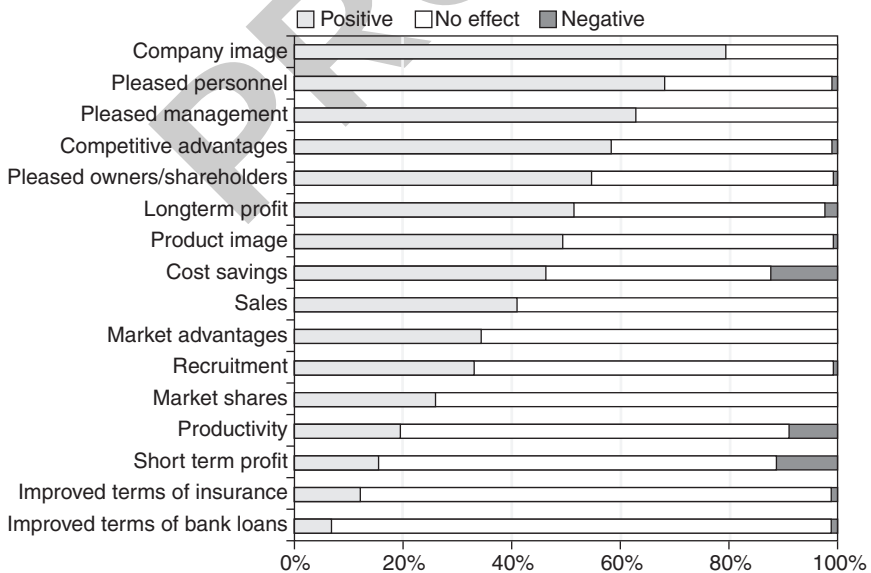


Figure 15.11 Effect of environmental activities on business.

from regulation, are more pronounced now (5–10 percent more) than four years ago. In comparison with other industrial sectors in Sweden (Nilsson and Hellström, 2001), construction regards regulation as a potential solution to its environmental problems.

## Discussion and conclusions

From this study, it can be easily concluded that there is an environmental inertia within the construction industry. Although companies within the industry are today active in environmental matters, e.g. having specialist personnel and advanced EMS, the industry overall is struggling. The study shows that the companies' environmental activities still focus on a few targeted measures, the companies continue to have a preference for waste management and environmental activities of a managerial kind and they, as in they did in 2002 (Baumann *et al.*, 2003), consider themselves to have accomplished most results in the areas of toxic substances and waste separation.

We started this chapter by asking, *what makes it slow?* The study reveals five possible reasons for this innovation inertia. First, there is the notion that the market for green products and services is dysfunctional and, therefore, does not stimulate innovation and novel approaches. The lack of market pull for green innovation within the construction industry has also been identified in other countries, for example in the Netherlands (Bossink, 2004). The perception is of an imperfect market and one where environmental work is too costly, making green innovation too risky financially. This belief is also

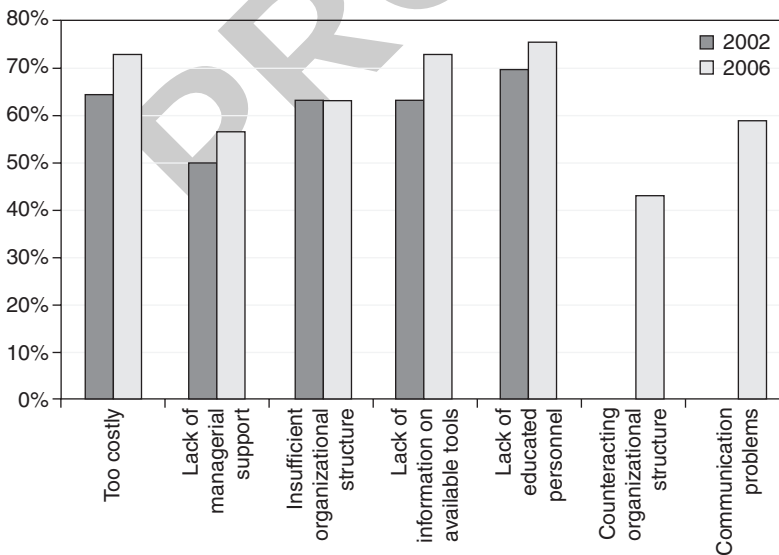


Figure 15.12 Extent to which internal obstacles have influenced environmental activities in the companies.

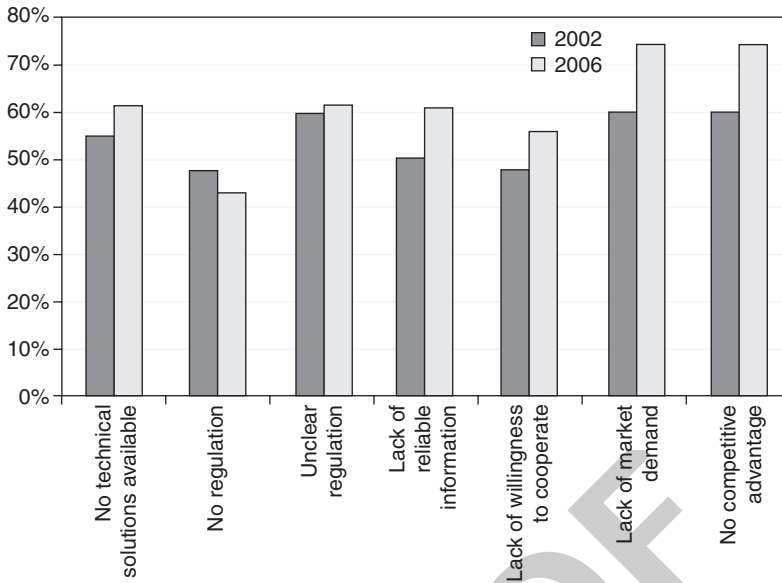


Figure 15.13 Extent to which external obstacles have influenced environmental activities in the companies.

accentuated by the perception that banks and other financial institutions have little or no effect on environmental activities, thus preventing environmental issues being included on the business agenda.

Second, one way of stimulating the creation of a market is through government initiatives in the form of regulations. The present study shows that many environmental managers consider legislation as the most likely solution to the industry's environmental problems. Why legislation – an approach that is usually met with resistance by the industry – is emphasized cannot be discerned from the survey. It might be symptomatic of environmental managers' frustration with getting across their message and so legislation would indirectly strengthen their current weak standing in their companies. It might also be a way for companies to minimize risks by forcing them to be spread over the whole industry. Nevertheless, legislation implacably nurtures bureaucratization and standardization, which is known to restrain the companies' incentive to approach the challenge from a different (and innovating) perspective. Previous research has, for example, shown that regulation may hamper innovation, especially if the regulatory process is too complex and too prescriptive (Gann *et al.*, 1998).

Third, for innovation adoption, it is essential that all actors have enough motivation to support innovative green solutions (Dulaimi *et al.*, 2002) and that they perceive a relative advantage from the new idea (Ling *et al.*, 2007). In order for goals and goal setting to have a motivating effect, it is thus important to provide information of whether one has achieved the

goals or not (Locke and Latham, 1984). While many companies say they have set environmental goals, the lack of follow-up activities and environmental performance measurements mean that the motivating effect does not take place.

Fourth, the lack of cooperative actions between actors involved in the construction process limits the opportunity to view products and services in a holistic way. The need for cooperative activities, both within and between different organizations, has been emphasized as important for innovation (Slaughter, 1998; Harty, 2005; Keast and Hampson, 2007; Ling *et al.*, 2007). Ling *et al.*, for example, conclude that for innovations to be implemented successfully a variety of organizational units need to be involved. They emphasize that organizations which maintain their competence through different cooperative means, including internal groups, R&D projects and long-termed relationships with stakeholders, achieve larger innovation capabilities than others.

Last, effective implementation of innovation strategies requires that continuous R&D effort is integrated within the firm's activities (Nam and Tatum, 1992). The present study has shown that companies have limited or even a complete lack of cooperation with R&D departments or institutes, as well as with other environmental knowledge-intensive organizations. It can be concluded, therefore, that the foundation and stimuli for the development and creation of pioneering green ideas, innovative green techniques and new green business opportunities are poor within the industry.

We conclude with a successful example of green innovation. In a case study of ten construction projects having a primary project goal to innovate in the field of sustainability (Bossink, 2004), it was found that the increased focus on green innovation not only raised the quality of the projects, but also sustained and enforced the companies' position in the market as well as improved and strengthened cooperative ties and procedures between those involved. So, in order to recommend green business to the industry the answer is not, therefore, to wait for legislation, but rather to be proactive and shoulder the environmental challenge by motivating employees, cooperating more widely and taking appropriate financial risks.

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